Solar Images to the IMAX

SolarMax

Heliograph Productions. Written and directed by John Weiley, *produced by* John Weiley *and* Robert Eather. *40-minute IMAX film.*

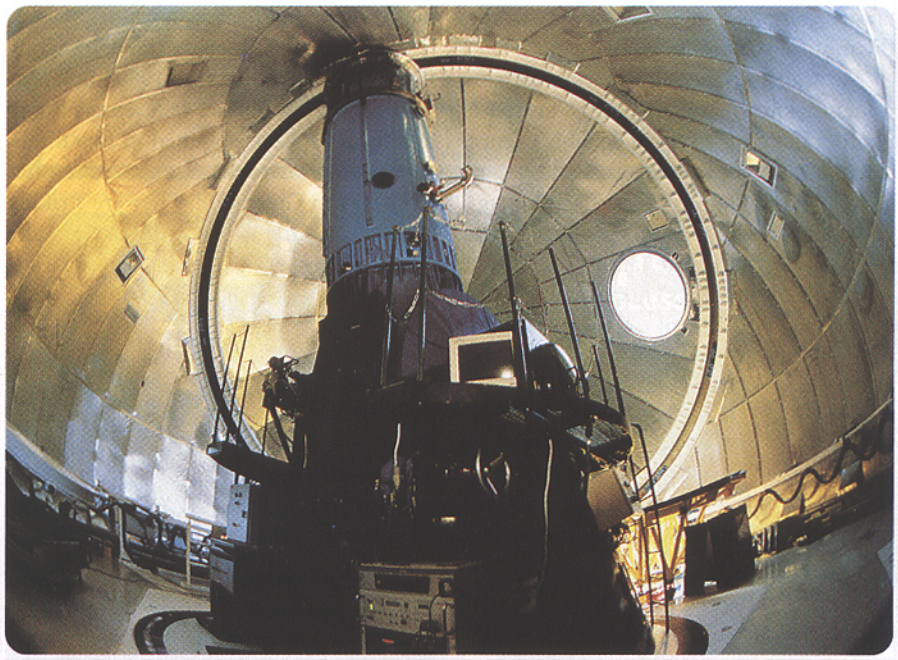
Review by Stephen P. Maran

THE MOST DRAMATIC MOTION PICtures ever made of the Sun and the aurora may be coming soon to a giant screen near you. They are highlights of the IMAX film *SolarMax*, which follows humanity's perceptions about the Sun from ancient times to the Space Age. The interaction of Sun and Earth is a major topic in the film, which opens with an impressive view of our planet surmounted by an auroral crown.

Moving down to the surface, the movie's wide vistas range from ancient ruins where the Sun was watched thousands of years ago, to modern mountaintop observatories. The movie crew spent three weeks in Norway to get one spectacular sequence of the midnight Sun and claim they visited sites on five continents while making the film.

SolarMax was directed by John Weiley of the Australian production company Heliograph, with major funding by the National Science Foundation. Auroral physicist and author Robert Eather was both producer and science adviser. It was Eather who invented the very-wide-angle lens used to take the auroral sequences in *SolarMax*. (According to one insider, presumably exaggerating a bit, if you stand behind the camera and operate it with this lens, your ears will show up at the edges of the frame as if you were a cartoon caricature of H. Ross Perot.)

Although you may have seen some of the solar images in *SolarMax* before, now you can enjoy them enhanced by advanced cinematic techniques. An 11-year



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Below: **Images of the Sun surely have never looked larger. *SolarMax*, a new film showing at IMAX theaters around the world, explores the study of and terrestrial effects of our active Sun. This portion of the solar disk was imaged by NASA's Transition Region and Coronal Explorer.**

Right: **The giant screen of an IMAX theater presents a larger-than-life view of the solar telescope at Mount Stromlo in Australia.**



The filming of *SolarMax* brought crews to locations around the world. *Left:* Director John Weiley (seated) prepares to shoot at the Newgrange tomb in Ireland. *Center:* Indigenous people await their turn in front of the camera at the ancient Inca city of Machu Picchu. *Right:* Twilight falls over Newgrange. ©2000 Museum of Science and Industry, Chicago; Heliograph Productions Pty. Ltd.

time-lapse sequence from Japan's Yohkoh X-ray satellite emphasizes the increase in activity as the solar disk enlarges across the wide IMAX screen toward the maximum of the cycle. Nor are your ears neglected — the original score by composer/clarinetist Nigel Westlake reaches a great crescendo as Yohkoh's sequence nears its peak. It's a far cry from Westlake's best-known composition, the cheery music for the motion picture *Babe*.

The academic specialty of space physics is better known for the study of space weather than for its visual delights. Hence an unexpected pleasure: the computer-generated animations of the Earth's magnetosphere wobbling and waving in the solar-wind gusts of the January 10, 1997, interplanetary storm. This sequence, displayed better than any I have seen, was generated by physicist Charles Goodrich (University of Maryland) based on software by John Lyon (Dartmouth College) and created at the Pittsburgh Supercomputing Center with NASA support.

There's a bit of science education in the film: Galileo's drawings of sunspots are shown to reveal the rotation of the Sun. And to my great delight there is a short sequence that actually explains spectroscopy! Certainly no one can leave the theater without having grasped at least that the Sun is a seething ball of eruptions and other activity, peaking every 11 years or so.

But for the most part, the Sun is offered for viewing pleasure, not postgraduate education. *Sky & Telescope* readers will enjoy *SolarMax*, maybe even attend repeatedly, as film buffs watch *Casablanca* again and again. This will be to relish the images, however, not to savor plot or characters. There are gorgeous sequences from both Yohkoh and the TRACE (extreme ultraviolet) Sun-watching satellite, but the unquestionable highlights are observations from two instruments on the Solar and Heliospheric Observatory (SOHO). This satellite's Extreme-ultraviolet Imaging Telescope and Large Angle and Spectrometric Coronagraph each took a special sequence of observations, lasting a full 28-day solar rotation during May and June 1998. The data, under current study by fascinated researchers, were furnished to the producers in digital form and converted brilliantly to the 70-millimeter IMAX film.

The auroral sequences, far surpassing the still photos in Eather's 1980 book *Majestic Lights: The Aurora in Science, History and the Arts,* were obtained in two three-week winter trips to Alaska and a one-week stay in Greenland. They are striking evidence of the Sun's influence on the Earth. The film makes allusions to more tangible effects of solar activity, including damage to orbiting satellites. According to Martin Huber of the European Space Agency, who spoke at a special *SolarMax* screening in early November in Washington, D.C., "Solar mass ejections can do serious damage to satellites orbiting around the Earth." If data from SOHO result in saving just one or two other satellites, Huber said, "SOHO will have paid for itself."

Of course there are other solar-activity-related effects, such as the failures of electric utility grids (*S&T:* March 2000, page 50). The unseen narrator of *SolarMax* (almost the only voice in the film) advises that "repairs after the last solar maximum cost more than a billion dollars."

The movie isn't all astronomical figures and facts — there's some human drama too. SOHO, lost in space on June 25, 1998, was recovered by ground controllers 12 weeks later. The control room where the scene (a reenactment) was filmed is at the Canberra station of NASA's Deep Space Network, where SOHO first "phoned home" after months adrift. Nowadays all control rooms look pretty much alike, but other laboratory scenes in the film are interesting indeed. An old shot of the quaint Norwegian laboratory where auroras were first simulated by O. Kristian Birkeland is contrasted with modern film of his own metallic sphere, or "terella," sparkling with artificial aurora. A view of a European clean room, where the Cluster II spacecraft were under test, takes full advantage of the unique capabilities of IMAX as the viewer feels engulfed by the chamber.

Solar science, danger, and drama — all in all, *SolarMax* is a "must see"!

Scheduled Theater Locations

- Taipei Astronomical Museum, Taipei, Taiwan
- Singapore Science Center, Singapore
- Reuben H. Fleet Science Center, San Diego, CA
- Pacific Science Center, Seattle, WA
- Sprint IMAX Theater, Kansas City, MO
- Denver Museum of Natural History, Denver, CO
- Discovery IMAX Theater, Berlin, Germany
- Forum der Technik, Munich, Germany

Subject to change. Courtesy Museum of Science and Industry.

Stephen P. Maran *is an Assistant Director of Space Sciences at NASA's Goddard Space Flight Center in Greenbelt, Maryland.*